Alg. 2 Warm Up # 9-3 Solve. Think about best approach.

1. $\frac{x+6}{2x} - 4 = \frac{10}{x}$

2. $\frac{5}{x-4} + \frac{6}{x} = 2 + \frac{11}{x}$

3. Convert: degrees <---> radians

a) $\frac{11\pi}{12}$ b) 72^{o} c) 140^{o}

1. $\frac{x+6}{2x} - 4 = \frac{10}{x}$

2. $\frac{5}{x-4} + \frac{6}{x} = 2 + \frac{11}{x}$

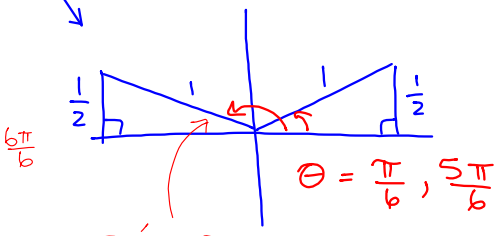
Preview

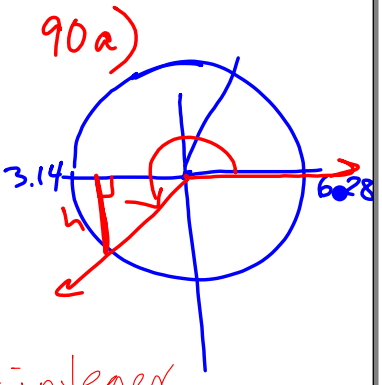
HW Questions:

7-90. Calculate the value of each expression below. Give an exact measurement, if possible. Each measure is given in radians.

a. $\sin(4)$ ≈ -0.76 b. $\sin(\frac{4\pi}{3})$

7-91 Find the exact values of the angles that are solutions to the equation $\sin(\theta) = 0.5$. Express your solutions in radians.





$\frac{\pi}{6} + 2\pi n$; where n = integer

$\frac{5\pi}{6} + 2\pi n$;

7-92. You have seen that you can calculate values of the sine function using right triangles formed by a radius of the unit circle. Values of θ that result in $30° - 60° - 90°$ or $45° - 45° - 90°$ triangles are used frequently on exercises and tests because their sine and cosine values can be found exactly, without using a calculator. You should learn to recognize these values quickly and easily. The same is true for values of $\cos\theta$ and $\sin\theta$ that correspond to the x- and y-intercepts of the unit circle.

The central angles that correspond to these "special" values of x are 30°, 45°, 60°, 90°, 120°, 135°, 150°, 180°, 210°, 225°, 240°, 270°, 300°, 315°, and 330°. What these angles have in common is that they are all multiples of 30° or 45°, and some of them are also multiples of 60° or 90°.

Copy and complete a table like the one below for all special angles between 0° and 360°.

Degrees	0	30	45	60	90	120		
Radians	0	$\frac{\pi}{6}$						

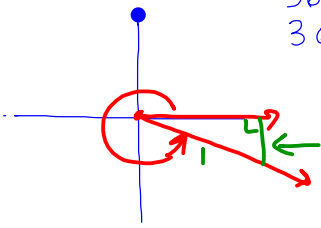
7-93. Draw a picture of an angle that measures 6 radians.

a. Approximately how many degrees is this?

b. Using only your picture, estimate the sine of 6 radians.

$360^\circ = 2\pi$ rad

$360^\circ \approx 6.28$ rad



7-94. Evaluate each expression without using a calculator or changing the form of the expression.

a. log(10)

b. $\log(\sqrt{10})$

c. log(0)

d. $10^{(2/3)\log(27)}$

Think: "What exponent on the base 10 would give you $\sqrt{10}$?"

7-95. What interest rate (compounded annually) would you need to earn in order to double your investment in 15 years?

$\frac{2P}{P} = \frac{P(1+r)^{15}}{P}$

$2 = (1+r)^{15}$

$\sqrt[15]{2} = 1 + r$

$r = \sqrt[15]{2} - 1$

$r \approx 0.0473$ $\approx 4.73\%$

operations undo each other

$10^{\log_{10}(27)^{2/3}} = (\sqrt[3]{27})^2 = 9$

7-96. Angle A is an obtuse angle with a sine of $\frac{3}{10}$. What is the tangent of angle A?

$\sin A = \frac{3}{10}$

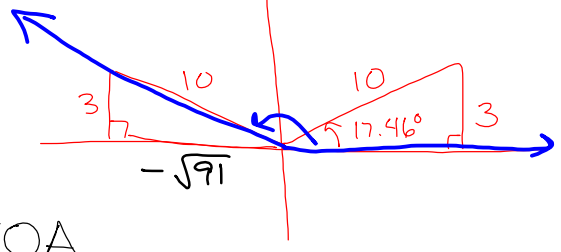
$A = \sin^{-1}\left(\frac{3}{10}\right) \approx 17.46°$

$\theta' \approx 17.46°$

SOH

def. obtuse

$90° < \theta < 180°$



TOA

$\tan A = \frac{3}{-\sqrt{91}} \cdot \frac{\sqrt{91}}{\sqrt{91}}$

$= -\frac{3\sqrt{91}}{91}$

tan A

tan | ANS

≈ -0.31

Obtuse

$\frac{\pi}{2} < \theta < \pi$

$\approx 1.57 < \theta <$

7-97. Find the inverse functions for the functions given below.

a. $f(x) = \sqrt[3]{4x-1}$

b. $g(x) = \log_7 x$

$x = \log_7 y$

$7^x = y$

7-98. Solve each of the following equations.

a. $2(x-1)^2 = 18$

b. $2^x + 3 = 10$

Blue CP's

7-75 Draw each angle on its own unit circle. (Standard position with initial side on the positive x-axis.)

Example: $\theta = \pi$ radians

a) $\theta = 60°$

b) $\theta = \frac{\pi}{2}$ rad.

c) $\theta = 270°$

d) $\theta = \frac{\pi}{4}$ rad.

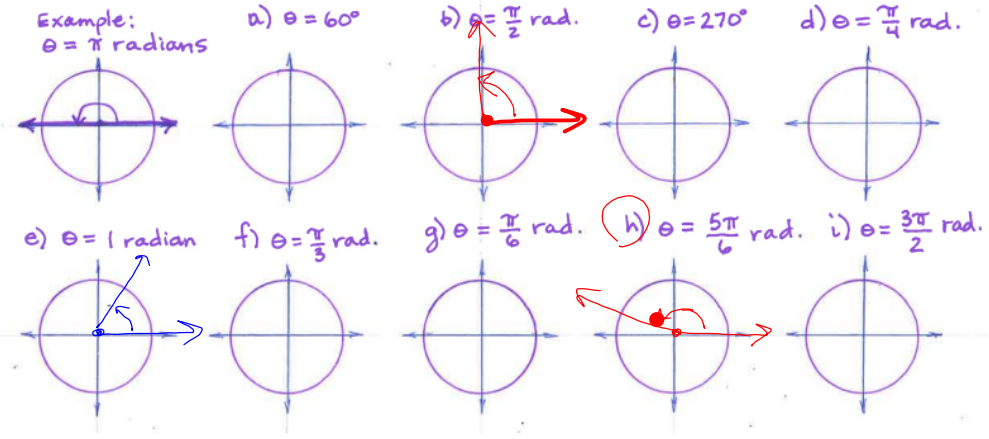
e) $\theta = 1$ radian

f) $\theta = \frac{\pi}{3}$ rad.

g) $\theta = \frac{\pi}{6}$ rad.

h) $\theta = \frac{5\pi}{6}$ rad.

i) $\theta = \frac{3\pi}{2}$ rad.

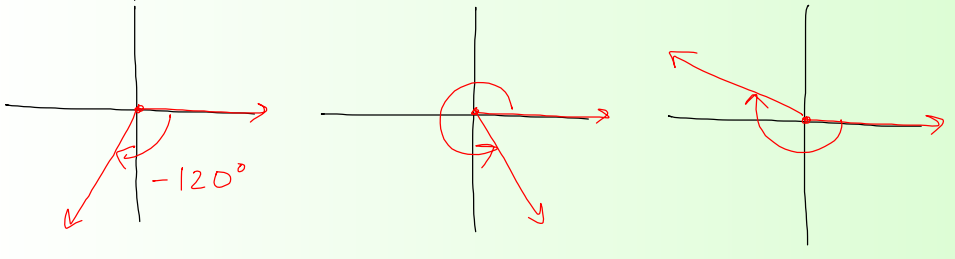


Draw each angle in Standard Position:

1) $-120°$

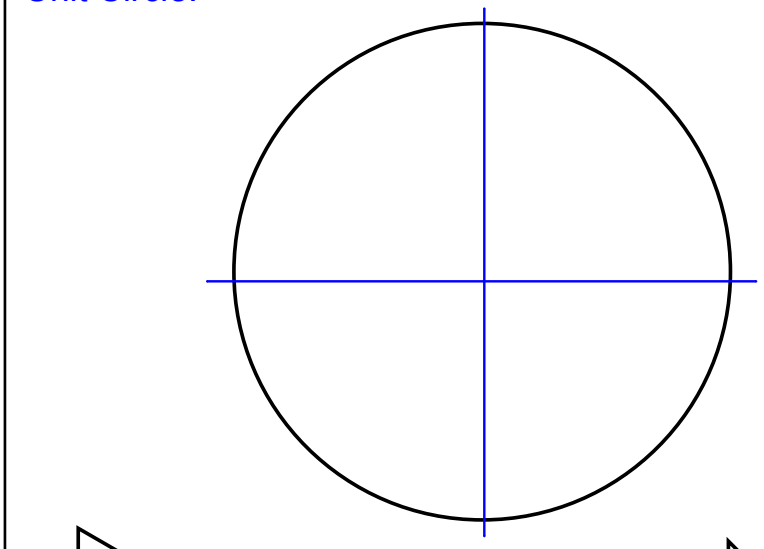
2) $\frac{5\pi}{3}$

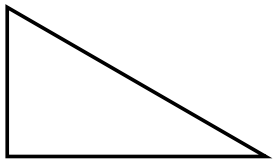
3) $-\frac{7\pi}{6}$

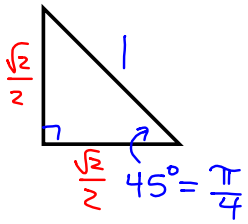


Negative angles rotate down from the positive x-axis.

Unit Circle:







Unit Circle:

$r = 1$

$(\cos\theta, \sin\theta)$

$(0,1)$ $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$\frac{\pi}{2}$ $\frac{2\pi}{3}$ $\frac{\pi}{3}$ $\frac{3\pi}{4}$ $\frac{\pi}{4}$ $\frac{5\pi}{6}$ $\frac{\pi}{6}$

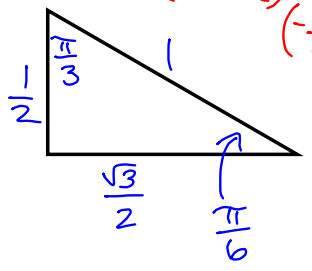
π $2\pi, 0$

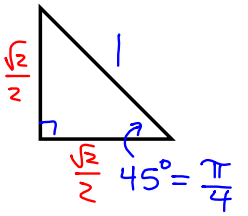
$(-1,0)$ $(1,0)$

$\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ $\frac{7\pi}{6}$ $\frac{11\pi}{6}$ ( )

$\frac{5\pi}{4}$ $\frac{7\pi}{4}$ $\frac{4\pi}{3}$ $\frac{5\pi}{3}$ $\frac{3\pi}{2}$

$\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ $(0,-1)$





HW: 7.1.6 Homework WS

Short Quiz Friday:
Solving Quadratics all three ways.
Changing Radians <---> Degrees.

EC: Something from the Unit Circle